

06-19-00

A

Practitioner's Docket No. 67264

PATENT

06/16/00
JCS51 U.S. PTO

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P. Section 601, 7th ed.

JCS29 U.S. PTO
09/595769
06/16/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

CERTIFICATION UNDER 37 C.F.R. SECTIONS 1.8(a) AND 1.10*

*(When using Express Mail, the Express Mail label number is mandatory;
Express Mail certification is optional.)*

I hereby certify that, on the date shown below, this correspondence is being:

MAILING

deposited with the United States Postal Service in an envelope addressed to Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

37 C.F.R. Section 1.8(a)

37 C.F.R. Section 1.10*

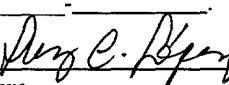
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Mailing Label No. EL502556863US
(mandatory)

TRANSMISSION

transmitted by facsimile to the Patent and Trademark Office (703) _____.

Date: June 16, 2000


Signature
LUZ C. LOPEZ
(type or print name of person certifying)

***WARNING:** *Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. Section 1.10(b).*

"Since the filing of correspondence under [Section] 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

Transmitted herewith for filing is the patent application of

Application Identifier No. W2648-67264A

Inventor(s):



WARNING: 37 C.F.R. Section 1.41(a)(1) points out:

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by Section 1.63, except as provided for in Section 1.53(d)(4) and Section 1.63(d). If an oath or declaration as prescribed by Section 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to Section 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in Section 1.17(l) is filed supplying or changing the name or names of the inventor or inventors."

For (title): METHOD FOR MAKING CARGO LINERS AND MATS WITH CHANNEL EDGE

1. Type of Application

This new application is for a(n)

(check one applicable item below)

Original (nonprovisional)
 Design
 Plant

WARNING: *Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

WARNING: *Do not use this transmittal for the filing of a provisional application.*

NOTE: *If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.*

Divisional.
 Continuation.
 Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. Sections 119(e), 120, or 121)

NOTE: *A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. Section 112. Each prior application must also be:*

- (I) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or*
- (ii) Complete as set forth in Section 1.51(b); or*
- (iii) Entitled to a filing date as set forth in Section 1.53(b) or Section 1.53(d) and include the basic filing fee set forth in Section 1.16; or*
- (iv) Entitled to a filing date as set forth in Section 1.53(b) and have paid therein the processing and retention fee set forth in Section 1.21(l) within the time period set forth in Section 1.53(f).*

37 C.F.R. Section 1.78(a)(1).

NOTE *If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

WARNING: *If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-I-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

WARNING: *When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application **must** be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. Section 1.78(a)(3).*

The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed

A. Required for Filing Date under 37 C.F.R. Section 1.53(b) (Regular) or 37 C.F.R. Section 1.153 (Design) Application

10 Pages of Specification
4 Pages of Claims
3 Sheets of Drawing

WARNING: *DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to Section 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 C.F.R. 1.84, see Notice of March 9, 1988. (1990 O.G. 57-62).*

NOTE: *"Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page. . ." 37 C.F.R. Section 1.84(c)).*

(complete the following, if applicable)

The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. Section 1.84(b).
 Formal
 Informal

B. Other Papers Enclosed

 Pages of declaration and power of attorney
1 Pages of Abstract
 Other

4. Additional Papers Enclosed

Amendment to claims
 Cancel in this applications claims _____ before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
 Add the claims shown on the attached amendment. (Claims added have been numbered consecutively following the highest numbered original claims.)
 Preliminary Amendment
 Information Disclosure Statement (37 C.F.R. Section 1.98)

- Form PTO-1449 (PTO/SB/08A and 08B)
- Citations
- Declaration of Biological Deposit
- Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
- Authorization of Attorney(s) to Accept and Follow Instructions from Representative
- Special Comments
- Other

5. Declaration or Oath (including power of attorney)

NOTE: A newly executed declaration is not required in a continuation or divisional application provided the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under Section 1.47 then a copy of that declaration must be filed accompanied by a copy of the decision granting Section 1.47 status or, if a nonsigning person under Section 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 C.F.R. Section 1.63(d)(1)-(3).

NOTE: A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and the residence, post office address and country of citizenship of each inventor, and state whether the inventor is a sole or joint inventor. 37 C.F.R. Section 1.63(a)(1)-(4).

NOTE: The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by Section 1.62, except as provided for in Section 1.53(d)(4) and Section 1.63(d). If an oath or declaration as prescribed by Section 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to Section 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in Section 1.17(l) is filed supplying or changing the name or names of the inventor or inventors. 37 C.F.R. Section 1.41(a)(1).

Enclosed

Executed by

(check all applicable boxes)

- inventor(s).
- legal representative of inventor(s). 37 C.F.R. Section 1.42 or 1.43.
- joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

This is the petition required by 37 C.F.R. Section 1.47 and the statement required by 37 C.F.R. Section 1.47 is also attached. See item 13 below for fee.

Not Enclosed.

NOTE: *Where the filing is a completion in the U.S. of an International Application, or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.*

Application is made by a person authorized under 37 C.F.R. 1.41 on behalf of *all* the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 C.F.R. Section 1.16(e), can be filed subsequently).

Showing that the filing is authorized.
(not required unless called into question. 37 C.F.R. Section 1.41(d))

6. Inventorship Statement

WARNING: *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

The same.

or

Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,
 is submitted.
 will be submitted.

7. Language

NOTE: *An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 C.F.R. Section 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 C.F.R. Section 1.52(d).*

English
 Non-English

The attached translation includes a statement that the translation is accurate.
37 C.F.R. Section 1.52(d).

8. Assignment

An assignment of the invention to _____

is attached. A separate "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or FORM PTO 1595 is also attached.
 will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters-one for the application and one for the assignment" Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: *A newly executed "STATEMENT UNDER 37 C.F.R. Section 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.*

9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. no.	Filed
Country	Appln. no.	Filed
Country	Appln. no.	Filed

from which priority is claimed

is (are) attached.
 will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 C.F.R. Section 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 C.F.R. Section 1.16)

A. [] Regular application

CLAIMS AS FILED

Claims	Number Filed	Basic Fee Allowance	Number Extra	Rate	Basic Fee 37 C.F.R. Section 1.16(a) \$690.00
Total Claims (37 C.F.R. Section 1.16(c))	13	- 20 = 0	x	\$ 18.00	0.00

Independent Claims (37 C.F.R. Section 1.16(b))	3	- 3 = 0	x	\$ 78.00	0.00
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Multiple Dependent Claim(s), if any (37 C.F.R. Section 1.16(d))			+	\$260.00	0.00
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[] Amendment cancelling extra claims is enclosed.
[] Amendment deleting multiple-dependencies is enclosed.
[] Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 C.F.R. Section 1.16(d).

Filing Fee Calculation \$690.00

B. Design application
(\$310.00--37 C.F.R. Section 1.16(f))
Filing Fee Calculation \$_____

C. Plant application
(\$480.00--37 C.F.R. Section 1.16(g))
Filing Fee Calculation \$_____

11. Small Entity Statement(s)

Statement(s) that this is a filing by a small entity under 37 C.F.R. Section 1.9 and 1.27 is (are) attached.

WARNING: *"Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under Section 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under Section 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this Section." 37 C.F.R. Section 1.28(a)(2).*

WARNING: *"Small entity status must not be established when the person or persons signing the . . . statement can unequivocally make the required self-certification." M.P.E.P. Section 509.03, 6th ed., rev. 2, July 1996 (emphasis added).*

(complete the following, if applicable)

Status as a small entity was claimed in prior application _____ / _____, filed on _____ from which benefit is being claimed for this application under:

35 U.S.C. Section 119(e),
 120,
 121,
 365(c),

and which status as a small entity is still proper and desired.

A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above) \$ _____

NOTE: Any excess of the full fee paid will be refunded if a small entity status is established refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under Section 1.136. 37 C.F.R. Section 1.28(a).

12. Request for International-Type Search (37 C.F.R. Section 1.104(d))

(complete, if applicable)

[] Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

[X] Not Enclosed

[X] No filing fee is to be paid at this time.

(This and the surcharge required by 37 C.F.R. Section 1.16(e) can be paid subsequently.)

[] Enclosed

[] Filing fee \$ _____

[] Recording assignment
(\$40.00; 37 C.F.R. Section 1.21(h))
(See attached "COVER SHEET FOR
ASSIGNMENT ACCOMPANYING NEW
APPLICATION.") \$ _____

[] Petition fee for filing by other
than all the inventors or person
on behalf of the inventor where
inventor refused to sign or cannot
be reached
(\$130.00; 37 C.F.R. Sections 1.47 and 1.17(I)) \$ _____

[] For processing an application with a
specification in a non-English language
(\$130.00; 37 C.F.R. Sections 1.52(d) and 1.17(k)) \$ _____

Processing and retention fee
(\$130.00; 37 C.F.R. Sections 1.53(d) and 1.21(l)) \$_____

Fee for international-type search report
(\$40.00; 37 C.F.R. Section 1.21(e)) \$_____

NOTE: 37 C.F.R. Section 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 C.F.R. Section 1.53(f) and this, as well as the changes to 37 C.F.R. Section 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of Section 1.21(l) must be paid, within 1 year from notification under Section 53(f).

Total Fees Enclosed \$_____

14. Method of Payment of Fees

Check in the amount of \$_____.

Charge Account No. _____ in the amount of \$_____.
A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. Section 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: *If no fees are to be paid on filing, the following items should not be completed.*

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.*

The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. _____

37 C.F.R. Section 1.16(a), (f) or (g) (filing fees)

37 C.F.R. Section 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. Section 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

37 C.F.R. Section 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

37 C.F.R. Section 1.17(a)(1)-(5) (extension fees pursuant to Section 1.136(a)).
 37 C.F.R. Section 1.17 (application processing fees)

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under Section 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in Section 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. Section 1.136(a)(3).

37 C.F.R. Section 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. Section 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. Section 1.311(b)).

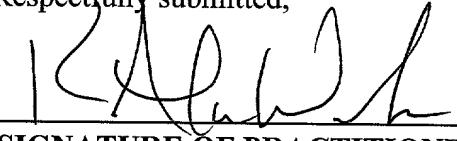
NOTE: 37 C.F.R. Section 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 C.F.R. Section 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

NOTE: ". . . Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. Section 1.26(a).

Credit Account No. _____.
 Refund

Respectfully submitted,


SIGNATURE OF PRACTITIONER

Reg. No.: 36,050

R. Alan Weeks

(type or print name of practitioner)

Tel. No.: (918) 599-0621

321 S. Boston Ave., Suite 800

P.O. Address

Customer No.: 22206
67037.1

Tulsa, OK 74103-3318



22206

PATENT TRADEMARK OFFICE

Incorporation by reference of added pages

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added _____

Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added _____

Plus added pages deleting names of inventor(s) named on prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added _____

Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added _____

[X] Statement Where No Further Pages Added

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

[X] This transmittal ends with this page.

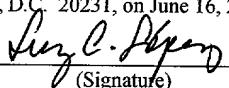
UNITED STATES PATENT APPLICATION

for

**METHOD FOR MAKING CARGO LINERS
AND MATS WITH CHANNEL EDGE**

CERTIFICATE OF EXPRESS MAILING UNDER 37 CFR 1.10
I hereby certify that this document and any document referred to as being attached therein is being deposited with the U.S. Postal Service in an envelope as "Express Mail Post Office to Addressee", Mailing Label No. EL502556863US, addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231, on June 16, 2000.

LUZ C. LOPEZ
(Name of Person Mailing Paper)


(Signature)

**METHOD FOR MAKING CARGO LINERS
AND MATS WITH CHANNEL EDGE**

BACKGROUND OF THE INVENTION

1. **Field of the Invention:**

This invention relates generally to a method for making cargo liners and floor mats for vehicles. More particularly, but not by way of limitation, the present invention relates to a thermoforming process for producing cargo liners or floor mats for vehicles which include a channel edge about at least a portion of the perimeter of the liners or mats.

2. **Background:**

Cargo liners for pickup trucks, SUVs, vans, and even automobile trunks are well known in the art, as are floor mats for all types of vehicles. A common method for manufacturing such devices is a plastic thermoforming process, in particular vacuum or pressure forming.

Vacuum forming and pressure forming are well known in the art. Generally, to vacuum form a plastic article, a mold is produced, either as a male likeness of the article over which material will be drawn, or a female likeness of the article into which material will be drawn. The mold is typically drilled with small passageways through which air may pass from the molding surfaces to the backside of the mold. A sheet of plastic is then heated until it becomes extremely pliable. The heated plastic is then placed adjacent the mold and vacuum is applied to the backside of the mold. Air passes through the passageways to create low pressure at the surface of the mold, thereby drawing the heated plastic tight against the mold so that the plastic takes on the shape of the mold. The plastic is then cooled and the

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molded sheet is lifted off the mold. Alternatively, in some cases, compressed air is applied to the backside of the mold so that the molded plastic is blown off of the mold. In a final step, surplus material is trimmed from the edge of the molded article, typically with a router.

Pressure forming is performed in much the same manner except, compressed air is applied to the heated sheet to press it onto the mold. In a sense, this is the same as the vacuum operation in that relatively high pressure air is on the outside of the plastic sheet and relatively low pressure air is on the mold side of the plastic sheet.

In either operation, water or forced air may be used to expedite cooling of the molded article.

While other methods are applicable to forming cargo liners and floor mats, thermoforming of sheet materials has proven to provide a cost effective method of producing finished product of consistent quality. However, a limitation of thermoforming arises in the subsequent trimming operation to remove surplus material from the perimeter of the article. A trimming guide may be used to guide the router operator in trimming the article. While a guide may work quite well when all of the trimming occurs in a single plane, the guide may become quite complex when trimming complex articles. Furthermore, the trimming operation may introduce some variability into the dimensions of the finished article and it is often difficult to produce a straight edge of consistent width.

Articles formed of relatively soft material may be hand trimmed using a knife. Unfortunately, hand trimming will often leave the trimmed edge of part irregular and the consistency of the operation is dependent on the skill of the individual. In addition, hand trimming places relatively large stresses on the wrists of the individual performing the

operation.

Therefore it can be seen that there is a need for a method for making cargo liners and floor mats using a thermoforming process which facilitates trimming of the molded part in a secondary operation.

5 It is thus an object of the present invention to provide a method for thermoforming a cargo liner or floor mat wherein a channel edge is formed during the molding process to facilitate cutting and to provide an improved article.

SUMMARY OF THE INVENTION

10 The present invention provides a method for making cargo liners and floor mats using a plastic molding process. In the inventive process, a steel rule or a groove is incorporated into the mold to produce a ridge in the molded part to facilitate subsequent trimming.

15 In a preferred embodiment, when heated plastic is drawn over a steel rule during a thermoforming process, a channel edge is formed in the plastic article about its perimeter. During a subsequent trimming operation to remove surplus material, trimming is performed on the ridge created by the steel rule thereby reducing variations in the edge which result from the trimming operation to produce an edge which enhances the appearance of the finished article with less dependance on operator skill during the trimming operation. An article produced by the inventive process will include a channel edge about at least a portion 20 of its perimeter.

While the inventive process is applicable to virtually any molding operation which

requires a subsequent trimming operation, it is especially well suited to thermoforming of plastic sheet materials. By way of example and not limitation, such processes include vacuum forming, pressure forming, and rotational molding. Furthermore, such forming may involve either a male mold or a female mold.

5 Further objects, features, and advantages of the present invention will be apparent to those skilled in the art upon examining the accompanying drawings and upon reading the following description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 provides an elevational view of a cargo liner made with the inventive method in its general environment.

5 FIG. 2 provides a cutaway view of a prior art mold with a sheet of plastic material
drawn over the mold.

FIG. 3 provides a cutaway view of the an inventive male mold incorporating a steel rule.

FIG. 4 provides a cutaway detail of an inventive male mold incorporating a steel rule.

FIG. 5 provides a cutaway view of a cargo liner made with the inventive method prior to the trimming operation.

FIG. 6 provides a cutaway view of a cargo liner made with the inventive method after the trimming operation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Before explaining the present invention in detail, it is important to understand that the invention is not limited in its application to the details of the construction illustrated and the steps described herein. The invention is capable of other embodiments and of being practiced or carried out in a variety of ways. It is to be understood that the phraseology and terminology employed herein is for the purpose of description and not of limitation.

The inventive method preferably relates generally to the thermoforming of plastic liners. By way of example and not limitation, the inventive method is ideally suited for the production of cargo liners for trucks, sport utility vehicles, automobile trunks, boats, etc. and for floor mats for vehicles in general. The inventive thermoforming method produces a ridge in the molded article which greatly facilitates trimming, enhances the appearance of the finished article, and improves the structural integrity of the finished article.

Thermoforming processes include vacuum forming, pressure forming, rotational molding, and the like. Thermoforming processes may utilize either a male mold wherein the plastic material is drawn over the mold, a female mold wherein the material is drawn into the mold, or a combination of both male and female details incorporated into a single mold. The inventive method is applicable to all such thermoforming processes. For the sake of simplicity, the preferred embodiment of the inventive method will be discussed in reference to a vacuum forming process however the invention is not so limited.

Referring first to FIG. 3 and 4, a preferred embodiment of a mold for use with the inventive method includes a steel rule 12 incorporated into male mold 14, rule 12 being

spaced substantially an equal distance **16** from the perimeter **26** of article **32** at all points along its path. The mold **14** is drilled with small passageways (not shown) such that air may pass freely from the molding surfaces **20** to the backside **22** of the mold. When vacuum is applied to the backside of mold **14**, low pressure will be present at the molding surfaces **20**.
5 A sheet of thermoplastic material **24** is heated until the sheet **24** becomes extremely pliable. Sheet **24** is then placed against the surface of mold **14** and vacuum is applied to the backside **22** of mold **14**, drawing sheet **24** tightly over mold **14**. Steel rule **12** creates a ridge in sheet **14** which follows perimeter **26** of article **32**. Sheet **24** is preferably cooled with water or forced air to accelerate the cooling process. Once cooled, sheet **24** is lifted from mold **14**, or alternatively compressed air may be applied to the backside **22** of mold **14** to remove sheet **24** from mold **14**. The shape impressed upon sheet **24** by mold **14** will remain upon removal of sheet **24** from mold **14**. With the exception of the steel rule **12**, the process described above is a vacuum forming process which is known in the art.

10 A prior art method of thermoforming is depicted in FIG. 2. Typically with a thermoformed article **102**, surplus material **100** must be trimmed from around the molded article **102**. A router is often used to perform this operation however, a guide or template is often used to improve the dimensional consistency and quality of such articles. Relatively soft thermoplastic materials may be hand trimmed with a knife to separate the molded part from the surplus material. However, hand trimming results in dimensional inconsistencies
15 along the edges of these articles.

20 Trimming of articles formed by the inventive method requires no such guide or template. Instead, a router or saw is located a predetermined distance above a table top such

that any material above a certain height will be removed and any material below the height will remain untouched. The height preferably being lower than the height of the ridge 30 (FIG. 5) created in sheet 14 by steel rule 12. Thus, when ridge 30 is passed under the router, trimming of the article will thus occur along ridge 30 as shown by the drawn line in FIG. 6. It will be obvious to those skilled in the art that the dimensions of article 32 (FIG. 6) will be determined by the position of ridge 30 independent of the skill of the operator performing the trimming and, furthermore, that no guides or templates are required to perform such trimming.

Relatively soft materials may be easily hand trimmed with a knife. The groove which is inherently formed on the side opposite the ridge, acts as a guide for the knife during a hand trimming operation. It will be apparent to those skilled in the art that the material at the bottom of the groove will be thinner than the original sheet of material thus reducing stresses placed on the wrists of the individual performing the hand trimming operation. These features facilitate faster, more accurate trimming resulting in increased production and lower scrap rates due to improper trimming.

Once trimmed, article 32 includes a substantially vertical peripheral wall portion 31, a transverse outer edge portion 33 and a nub 35, thus forming a channel edge 34, the width of which corresponds to the distance 16 between mold 14 and steel rule 12. Channel edge 34 provides an enhanced appearance to article 32 over articles produced by prior art methods.

In addition, channel edge 34 improves the structural integrity of article 32.

In another embodiment, a groove is provided about the perimeter of a female mold. The groove is provided with passageways periodically about its path to ensure that the sheet

will be drawn into the groove during the forming operation. The forming operation for a female mold is similar to the forming operation with a male mold 14 discussed hereinbefore. The sheet is first heated, placed over the opening of the cavity, vacuum is applied to the backside of the mold thereby tightly drawing the sheet into the cavity. After cooling, the sheet is removed from the cavity or, alternatively, compressed air may be applied to the backside of the cavity to separate the sheet from the mold. Trimming of an article molded in a female mold is identical to the trimming of article 24 formed over male mold 14.

A cargo liner 110 produced by the inventive method is shown in FIG. 1. Cargo liner 110 includes a channel edge (not shown) which is formed as article of the inventive method. Preferably, the channel edge is of substantially uniform width giving cargo liner 110 an enhanced appearance as compared to liners produced by prior art methods.

Although the inventive method is discussed herein and described in reference to the production of a cargo liner, it is equally applicable to the production of floor mats for vehicles or any other type of formed liner.

As will be apparent to those skilled in the art, sheet goods for thermoforming are available in a variety of materials and thicknesses. The inventive method is applicable to all such sheet goods.

Thus, the present invention is well adapted to carry out the objects and attain the ends and advantages mentioned above as well as those inherent therein. While presently preferred embodiments have been described for purposes of this disclosure, numerous changes and modifications will be apparent to those skilled in the art. Such changes and modifications

are encompassed within the spirit of this invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A method for making a molded article, wherein said article includes a substantially vertical peripheral wall portion and a transverse outer edge portion, comprising:
 - (a) heating a sheet of plastic material having a mold side and an exposed side to a first temperature, said first temperature being consistent with forming said sheet of plastic material in a thermoforming process;
 - (b) placing said mold side of said sheet of plastic material over said mold, said mold having a first surface for forming said substantially vertical peripheral wall portion and further having a second surface substantially perpendicular to said first surface for forming said outer edge portion;
 - (c) applying a vacuum to said mold or compressed gas to said exposed side of said sheet of plastic material such that air pressure on said mold side is less than the air pressure on said exposed side;
 - (d) forming a ridge along at least a part of said outer edge portion, said ridge being of a substantially uniform height;
 - (e) cooling said sheet of plastic material to a second temperature, said second temperature being consistent with said sheet of plastic material retaining its molded shape;
 - (f) releasing said vacuum from said mold or said compressed gas from said exposed side;
 - (g) removing said sheet of plastic material from said mold; and

(h) cutting said sheet of plastic material along said ridge to release said article from said sheet.

2. The method according to claim 1, wherein step (d) further includes forming said ridge about the entirety of said outer edge portion at a substantially coequal distance from said wall portion.

3. The method according to claim 1, wherein said mold includes a steel rule and said ridge is formed over said steel rule.

4. The method according to claim 2, wherein there is provided after step (h) a channel edge of a substantially uniform width about the periphery of said article.

5. An article made according to the method of claim 1.

6. An apparatus for thermoforming a molded article, wherein said article includes a substantially vertical peripheral wall portion and a transverse outer edge portion, comprising:

a mold having a first surface for forming said substantially vertical peripheral wall portion and further having a second surface substantially perpendicular to said first surface for forming said outer edge portion; and

means on said mold for forming a ridge along at least a part of said outer edge

portion, said ridge being of a substantially uniform height.

7. The apparatus according to claim 6, wherein said mold is a male mold.

8. The apparatus according to claim 7, wherein said means for forming said ridge comprises a steel rule.

9. The apparatus according to claim 8, wherein said steel rule encompasses substantially all of said perimeter of said mold.

10. The apparatus according to claim 6, wherein said mold includes passageways for the passage of air.

11. A method for making a molded article, wherein said article includes an outer edge portion, comprising:

(a) molding an article having an outer edge portion from plastic material in a mold, said outer edge portion having a ridge along at least a part of said outer edge portion, said ridge being of a substantially uniform height; and

(b) cutting said article along said ridge such that said ridge defines the outer edge of said article.

12. The method according to claim 11, wherein step (a) further includes molding said ridge about the entirety of said outer edge portion.

13. The method according to claim 11, wherein said mold includes a steel rule and said ridge is formed over said steel rule.

ABSTRACT OF THE DISCLOSURE

A method for making a cargo liner or a floor mat using a plastic molding process wherein a male mold includes a steel rule about its perimeter or a female mold includes a groove about its perimeter creating a ridge in the molded article to allow trimming of surplus material from the article along the ridge such that the dimensions of the finished article are determined by the ridge. In a preferred embodiment, an article is molded in a thermoforming process, the article thus produced includes a channel edge which enhances the appearance of the finished article and improves its structural integrity.

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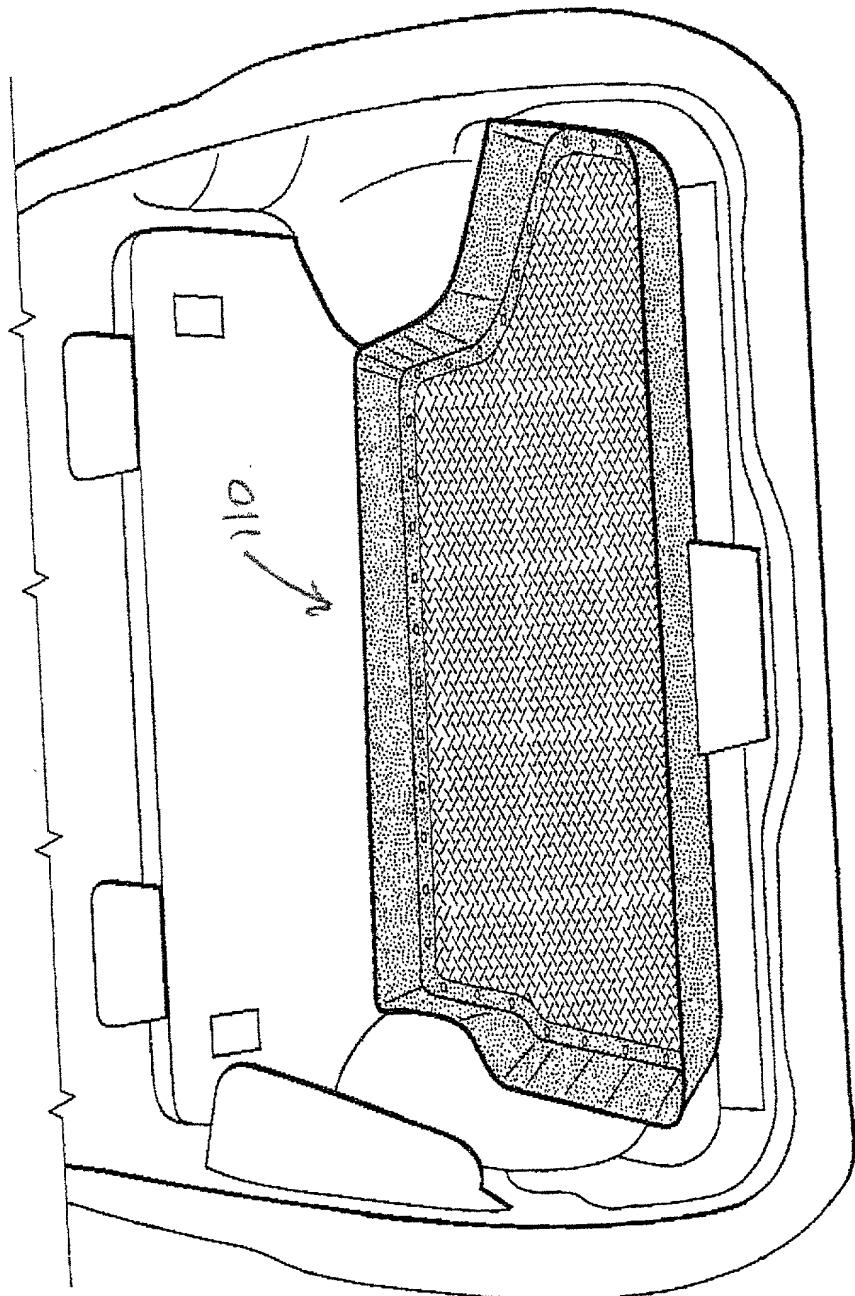


Fig. 1

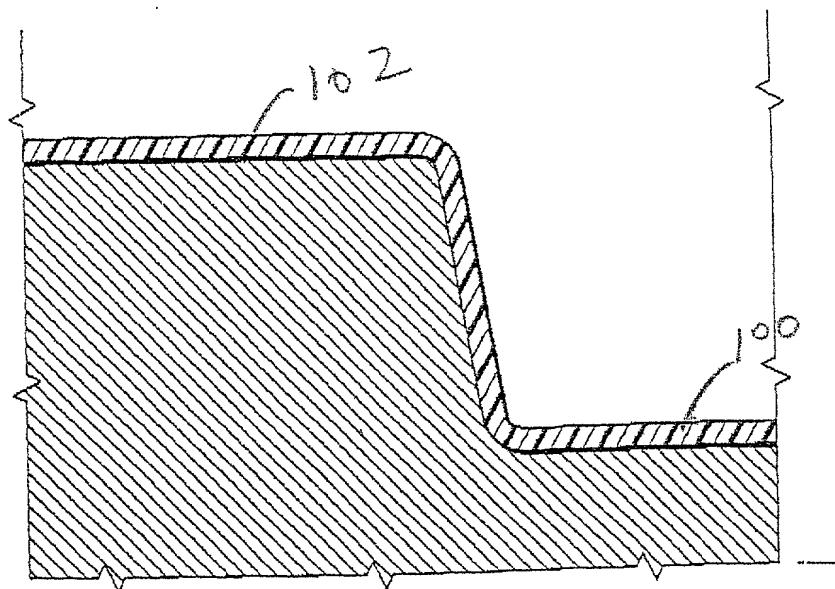
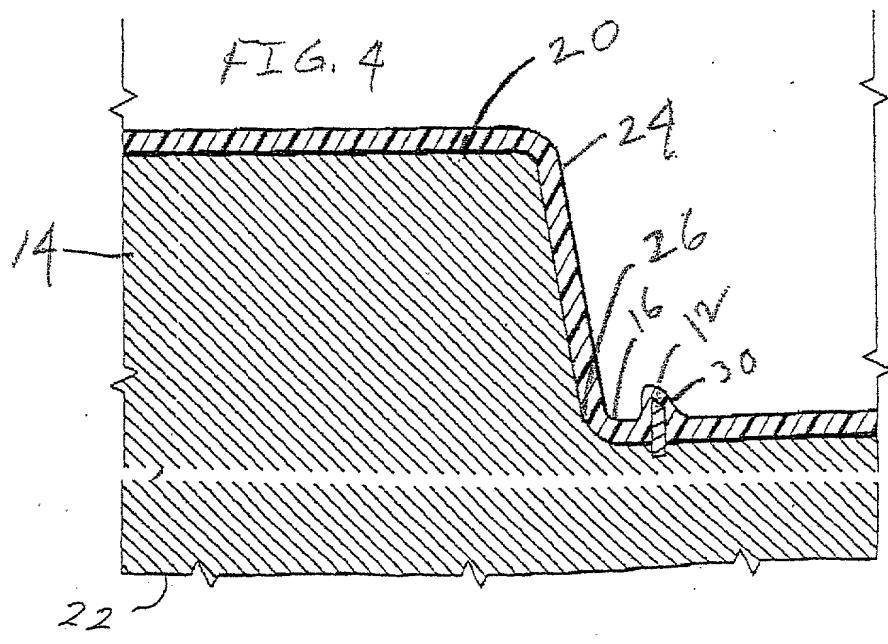
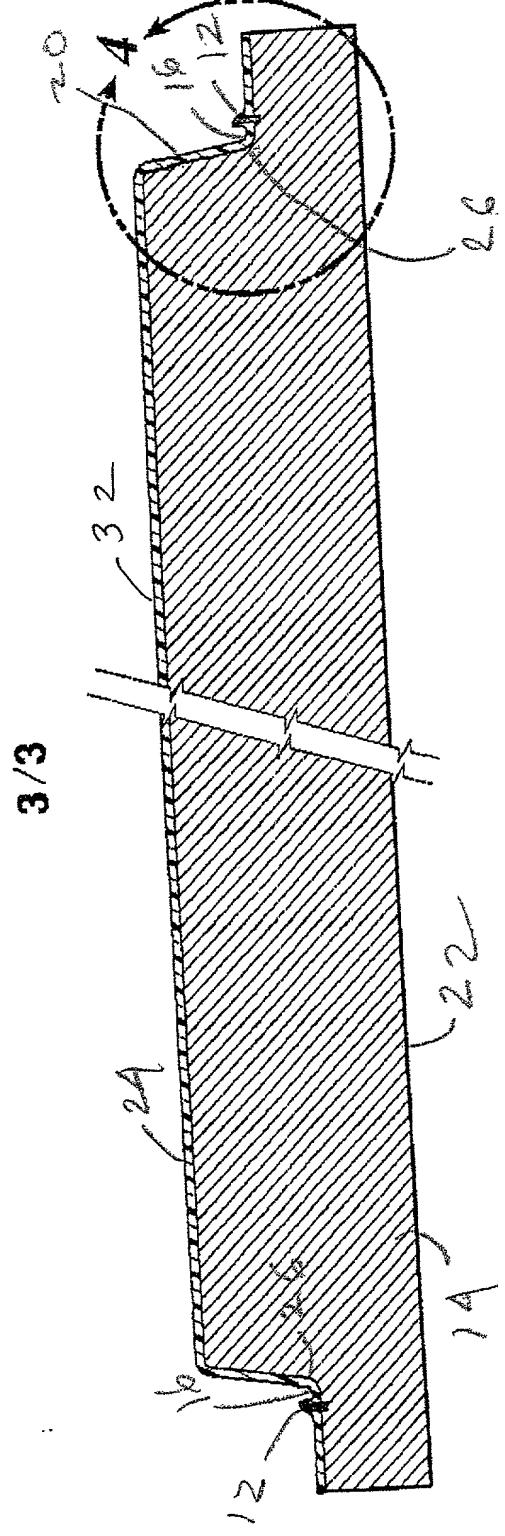


Fig. 2
(PRIOR ART)

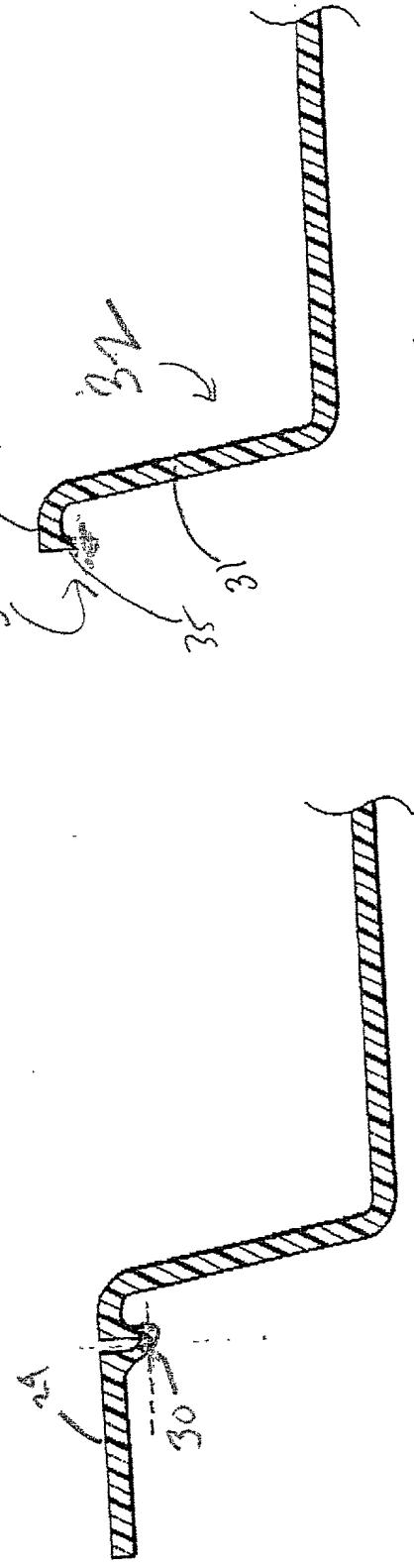


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